Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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DOUGLAS McKAY, Secretary

FISH AND WILDLIFE SERVICE

JOHN L. FARLEY, Director

Commercial Fisheries Abstracts

Prepared in the Branch of Commercial Fisheries

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

0	General and theoretical	5	Vitamins
1	Fish by species	6	Fishery byproducts
2	Fresh fish	7	Analytical Methods
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Issued with the approval of the Bureau of the Budget, December 29, 1953

9.2 QUARTERLY OUTLOOK FOR MARKETING FISHERY PRODUCTS, APRIL - JUNE, 1954

Anonymous
Fishery Leaflet 336t, United States Department of the Interior, Fish and Wildlife Service, Washington 25, D. C. (April, 1954)

This report is the twenty-first in a series of quarterly appraisals of economic conditions with predictions of marketing prospects for fishery commodities. Consisting of 30 pages and 59 charts, illustrating present or past trends, the report forecasts the market outlook for some 45 major fishery commodities during the three-month period.

A summary of the major features of the leaflet appears in the section entitled "The Outlook at a Glance." It forecasts a lower rate of general business activity in this quarter as compared to the corresponding period in 1953. The market for food will be fairly steady, with large supplies available and with a good demand. The market for edible fishery products will be good this quarter. For fishery byproducts, the market will be firm for fish meal and fish solubles, and steady for fish oils and fish-liver oils.

The production of fishery products will increase this quarter for those species marketed fresh or frozen, while production for canning and byproducts will be low. Holdings of fishery products in cold storage are moderate for fin fish but rather high for shellfish, especially shrimp and scallops.

The importation of canned fishery products and fish fillets will be at a higher rate as compared to the second quarter of 1953, and at about the same general rate for other fishery products. Exports of fishery products are expected to be low.

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 ABSTRACTER: Wm. H. Dumont

0.6 ANNUAL REPORT OF THE FISHERIES EXPERIMENTAL LABORATORY FOR 1953

Anonymous
Annual Report of the Fisheries Experimental Laboratory for 1953 (Denmark) (1954) 31 pp.

The investigations conducted at the Danish fisheries laboratory included studies on the storage of live lobster, fresh herring and salmon, frozen fish, non-sterile canned fish, canned fish, salted fish, and fish silage.

Different types of salt water for use in the storage of live lobsters were tested. Artifical sea water made according to two different formulae was found to substitute fully for natural sea water, whereas the lobsters could not live in water made up with any of the examined commercial products sold as "solar salt."

Refrigeration of the water in which live lobsters are held is recommended. Advantages obtained by refrigerating the water include: The water dissolves more oxygen at 6° C. than at 16° C. The animals' metabolic rate at 6° C. is less than half the rate at 16° C.; feeding is no problem as they do not eat at 6° C., and the amount of excretory products is reduced considerably.

A single trial, in which salmon were dipped on board the vessel in a nitrite solution (1-5 minutes in a 0.2% solution) and iced immediately thereafter in the usual manner showed that, although the number of days that the fish could be kept before spoiling was not essentially increased, they were clearly of better quality during the storage. A distinctly better preservation of the pink color of the flesh was particularly noticeable.

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 ABSTRACTER: Kathryn L. Osterhaug

9.19 ADVANTAGES IN DRUGGING FISH

Anonymous
Pan American Fisherman 8, No. 8, 4 (March, 1954)

The use of sodium amytal, a hypnotic-type barbiturate, in transporting live fish in tanks has been reported by the California Department of Fish and Game. This is said to provide several advantages:

In a state of narcosis the fish use less oxygen, and therefore need less water in transit. Where planting crews formerly carried 200 fingerlings to the gallon of water, the new system enables them to carry an average of 500 or more. A solution of one-half grain of sodium amytal to the gallon of water is said to reduce the amount of water necessary to only a third or a quarter of that normally required. Fish planting costs are expected to be cut in almost the same proportion.

One of the important advantages of the use of the drug is that it increases the temperature tolerance of the fish. This is especially important where the fish are to be moved from water of colder temperature to that of warmer temperature, or where the temperature of the water in the transporting tank is allowed to become somewhat high.

As soon as the fish are liberated, the small amount of drug in their system becomes diluted by fresh water and they immediately swim away.

The possible use of sodium amytal on salt-water fish is being investigated. It is hoped that it can be used in collecting live marine specimens for scientific use and aquarium display, for tagging, and for transporting bait fish.

 ABSTRACTER: Roy C. Stevens

7.80 BRITISH DEVELOP NOVEL METHOD OF DETERMINING FRESHNESS OF FISH

Anonymous
United States Department of the Interior, Fish and Wildlife Service, Seattle, Washington, Fishery Products Report No. S-42 (March 3, 1954)

Experiments on judging the freshness of fish by the glaze in its eyes are being carried out at the Torry Research Station, Aberdeen, Scotland, reports the December 1953 Fish Industry, a British fishery magazine. The eyes of the fish are compared with a series of glass eyes, and it is claimed that this method is an accurate guide in determining how long a fish has been out of the water.

The glass eyes are filled with liquids of different cloudiness, each corresponding to the eye-glaze of fish for which accurate records have been kept on the length of time out of the water. The one which matches the eye of the fish being examined reveals how long that fish has been out of the water.

These experiments are being made to enable scientists to compare the efficiency of different methods of storing fish, and to check on the age of fish landed by fishing vessels.

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QUARTERLY OUTLOOK REPORT

NARCOSIS IN TRANSPORTATION OF FISH

REPORT ON DANISH INVESTIGATIONS

JUDGING FRESHNESS OF FISH

9.19 (Cross Reference: 2.1127)

7.80 (Cross Reference: 2.00)

9.2

With the development of new products, such as tuna pies and fish sticks, the demand for certain fishery products is expected to be strong and will stimulate the importation of those species used in these products.

The Outlook Report forecasts a strong market for cod fillets, canned salmon, and lake trout, and an active market for fresh mackerel. A firm market is predicted for haddock and ocean perch fillets, canned mackerel, sablefish, fresh, frozen and mild-cured salmon, canned sardines, swordfish, canned tuna, fresh clams, and spiny lobsters. There should be a steady market for pollock fillets, salt herring, whiting, canned crabs, scallops, and canned shrimp. Items expected to have a fairly steady market are flounders and sole, halibut, common lobsters, fresh and frozen shrimp, blue pike, yellow pike, whitefish, and yellow perch. The shad market, which will be strong at the beginning of the quarter, will be weak due to larger supplies around the middle of the quarter. The market for rockfishes and oysters will be dull, while that for canned anchovies, canned herring, smelt and fresh crabs and crab meat will be unsettled.

0.6 (Cross Reference: 1.0142)

Among the various types of plastic film used for packaging cooked, peeled shrimp for freezing, Cry-O-Vac was found to give the best quality. This material, however, has several disadvantages to its use on a commercial scale. For example, in the form of bags it involves a considerable amount of labor, and in the frozen state the bags have an irregular form which may lower their commercial value. Experiments are being conducted in which the cooked and peeled shrimp are frozen in small blocks which are given a water glaze.

In continuation of previous experiments, new recipes for breadings for shrimp and fish fillets were tested. A suitable breading mixture contains wheat flour, skim milk and egg powder. Fillets breaded before freezing gave a prime quality product when stored at -20° C. for 4 months.

Factors studied in the production of non-sterile canned fish include: (1) The influence of the initial bacterial count on the keeping quality of Gaffelbidder (herring tidbits). (2) The bacterial growth in Gaffelbidder and the distribution of bacteria in sauce and meat. (3) The effect of organic acids on the bacterial growth in Gaffelbidder. (4) The effect of CO_2 on bacterial growth. (5) The effect of freezing on the content of living bacteria. (6) Flip-test of cans packed with Gaffelbidder. (7) Freezing of Gaffelbidder.

Investigations on the production of canned fishery products included the following: (1) Processing of glass jars. (2) Preparing herring and brisling sardines for canning. (3) Effect of the amount of water in the oil in herring sardines packed in oil. (4) The effect of water glazing on frozen brisling intended for canning. (5) Bacteriology of canned fish.

9.3 SHRIMP CANNERS SET NEW STANDARDS

Anonymous
Southern Fisherman 14, No. 2, 31, 39 (February, 1954)

Representatives of the shrimp canning industry met at New Orleans recently to formulate new standards for canned shrimp. The following resolutions were adopted, to become effective as of August 1, 1954:

1. That the standard should include six grades instead of the present four, and that these grade sizes be based on cut-out weight per ounce after processing. Grade sizes were adopted as follows:

   a. Collosal -- Less than 2 1/2 shrimp per ounce.
   b. Jumbo -- Less than 3 1/2 shrimp per ounce.
   c. Large -- 3 1/2 to 5 shrimp per ounce.
   d. Medium -- More than 5 but not more than 9 shrimp per ounce.
   e. Small -- More than 9 but not more than 17 shrimp per ounce.
   f. Tiny -- More than 17 shrimp per ounce.

2. That all grade sizes be shown on the labels.
3. That a tolerance for cleaned and deveined shrimp of plus eight percent of each count of regular pack be allowed to offset deveining loss.
4. That any shrimp consisting of less than 50 percent broken by weight be classified as "whole and broken", or with the appropriate size designation plus the word "broken", or as "broken" -- and that more than 50 percent by weight be classified as "broken."

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 ABSTRACTER: Roy C. Stevens

8.612 VITAMIN A IN A SHRIMP'S EYE

Anonymous
Food Technology 8, No. 3, 9 (March, 1954)

Fish liver oils used to be the major source from which vitamin A was made. Europe still obtains a large quantity of this vitamin from Antarctic whales that are captured with the aid of radar and explosive harpoons and processed on board factory ships. By comparison with the most recent advances, this is still the hard way of obtaining vitamin A.

The first synthetic or man-made vitamin A available in America in commercial quantities appeared in 1948. The result was startling. Within a very short period the whole American industry had changed from the production of natural vitamin A to that of synthetic vitamin A.

Has interest in whales been lost as a result of this change? No, scientists still keep an eye on those whales, for they, along with the other creatures of the sea, still hold secrets about vitamin A that may be of value to man.

It is interesting to know, for example, that whales feed interminably on shrimp. These shrimp are known to manufacture vitamin A in their eyes in considerable quantity. Large specimens of the shrimp Meganyctiphanes norvegica may contain as much as 12,000 International Units of vitamin A per gram of dry weight. The potency of the vitamin A oil from these deep-sea crustaceans when determined by chemical methods has been found to be 2 or 3 times the value obtained by biological assay. The answer to this anomaly when found may help us to obtain better and more versatile synthetic vitamin A.

 ABSTRACTER: Martin Heerdt

6.9 PILOT PLANT TO MAKE FERTILIZER FROM SEA WATER

Anonymous
United States Department of the Interior, Fish and Wildlife Service, Seattle, Washington, Fishery Products Report No. S-44 (March 5, 1954)

A pilot plant for the extraction of potassium fertilizer from sea water was recently completed at Ijmuiden, near Amsterdam, Holland, the Norwegian Information Service announced on February 4. A Norwegian electro-chemical concern and a Dutch company cooperated in the construction of the pilot plant.

Initial output of the pilot plant will be 1,600 metric tons a year. Eventually, separate plants will be built in Norway and the Netherlands. Other countries may also be licensed to use the patented process. By then the Norwegian firm will be able to produce all ingredients required for complete fertilizers, with the exception of phosphorus. Potassium nitrate, the chemical extracted from sea water under the new process, contains two key plant nutrients--potassium and nitrogen--and is thus superior to potassium chloride and potassium sulphate as raw material for fertilizers.

As an indication of the potential significance of the new venture, in 1952 Norway spent Kr. 32 million (U. S. $4.8 million) of foreign exchange to import 45,000 metric tons of potassium fertilizer while the Netherlands imported 160,000 metric tons of the same product valued at Kr. 115 million (U.S. $16.1 million).

The Norwegian engineer who pioneered the promising process, began to study methods of extracting potassium nitrate from sea water many years ago. To test his findings, the Norwegian firm built an experimental plant on Heroya in the late 1930's. However, this plant was blown up in a

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6.137 FATTY ACIDS SEPARATED BY CRYSTALLIZATION FROM ACETONE

Anonymous
Chemical Processing 17, No. 3, 14 (March, 1954)

By means of controlled crystallization from acetone, almost any mixture of fatty acids can be separated in a single step. Relatively pure low-iodine-value saturated acids such as stearic and palmitic, and unsaturated acids having a titer of 0° to 5°C. are obtained simultaneously. The unsaturated acid liquid fraction may be separated further, if desired, into a solid oleic fraction and a linoleic-linolenic liquid fraction.

Acetone is mixed with the distilled fatty acids. This mixture is precooled with water in a series of double tubular-pipe heat exchangers and then chilled with ammonia in a series of double tubular-pipe chillers fitted with spring-mounted scrapers. Temperatures of -18° to -45°C. are used to achieve the desired separation of the fatty acids according to their crystallization characteristics. Temperatures at the lower limits of the chilling range are necessary to separate oleic acid from linoleic acid. The still liquid acids are removed from the crystallized acids in an insulated rotary vacuum filter under a slight nitrogen pressure after which they are washed by an acetone spray.

Filtrate and wash are combined. Acetone is recovered from this mixture by distillation and the remaining fatty acids are stripped with steam to remove any traces of acetone. After the crystalline cake has been heated and allowed to melt, acetone is removed by distillation and the fatty acid is stripped with steam to remove any remaining traces of acetone.

 ABSTRACTER: Martin Heerdt

6.9

bombing raid during World War II.

Production will be based on a new process originated by the chief chemical engineer of the Norwegian firm and subsequently developed by Dutch and Norwegian industrial scientists.

Further research and evaluation of the result are required before a decision can be reached on commercial exploitation of the invention. Meanwhile, patents on the revolutionary method have been filed in nearly all countries.

At the end of the war, independent research on the same problem was started by a Dutch nitrate firm. After a year or so the Dutch firm contacted the Norwegian company in an effort to seek a common approach. Eventually, a joint research organization was set up in Oslo to develop the process. The result of the combined efforts is called the Norduco process.

9.3 (Cross Reference: 1.85)

5. That the present industry practice of allowing a tolerance of not more than 5 percent of broken shrimp in any grade size be continued.
6. That a copy of the resolutions be sent to the Food and Drug Administration, Department of Health, Education and Welfare, New Orleans, Louisiana.
7. That wide and thorough publicity be given to the standards.

2.41 CANADIANS TEST NEW FRESH FISH SHIPPING CONTAINER

Anonymous
United States Department of the Interior, Fish and Wildlife Service, Seattle, Washington, Fishery Products Report No. S-47 (March 10, 1954)

Fresh (unfrozen) fillets of haddock and cod arrived in Ottawa in top-quality condition after a 100-hour trip from Newfoundland by boat and rail recently. This is believed to be the first time that fresh Newfoundland groundfish fillets have arrived in such prime flavorful condition after being shipped for such a distance, states the January Trade News, a Canadian Department of Fisheries publication.

The test shipment was made by the Canadian National Railways using the recently developed fish shipping container. Plant-chilled prior to shipment after being caught in the inshore waters adjacent to Isle Aux Mortes on the south coast of Newfoundland, the fillets were landed at Port Aux Basques for delivery to Ottawa.

The fillets were held in the containers at a constant temperature of 29° F. in transit. Both the haddock and cod fillets were moist and firm and tests showed them to be perfect in condition, color, taste, and freshness.

A test group of senior officials of the Department of Fisheries examined the fish and sampled it after it was cooked in the Department's Home Economics kitchen. Uncooked samples were also delivered to a selected number of people in Ottawa, who all reported that the quality was excellent and equal in freshness and flavor to fresh-caught fish

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2.115 FISHING VESSEL LIVE-BAIT EQUIPMENT

Carlson, Carl B.
Commercial Fisheries Review 16, No. 1, 1- 7 (January, 1954)

The pole-and-line fishery for tuna is dependent on adequate supplies of live bait, and the potential range of the tuna fishing vessel depends in part on the vessel's ability to carry large quantities of bait. The equipment used to capture bait and to preserve it alive varies from the simple net and rowboat combined with a tank of noncirculating sea water used in the Cuban fishery to the very elaborate system on United States Pacific tuna clippers.

In the Hawaiian fishery more elaborate equipment is used for capturing and holding bait alive. Bait is caught in fine mesh nets at night by using lights to attract it to lift nets or surround nets, or during the day by using large encircling nets. Outboard motors power the net boats and the bait is transferred to the vessel with buckets to prevent injury. Live-bait wells are built in the hull and are fitted with screened holes below the water line to permit the entrance and exit of sea water. Bait may be kept alive from one to several weeks in wells of this nature.

In the U. S. Pacific albacore fishery the system of capturing and holding bait alive was derived from the tuna clippers, but is less elaborate and the vessels are smaller. Circulating water is supplied by pumps and the bait is caught in large lampara nets set from a powered boat or from the fishing vessel.

On U. S. Pacific tuna clippers is found the most elaborate system in the world for capturing and holding bait alive. The structure of the bait tanks must be adequate for the weight of water plus safety factors for service at sea. The amount of bait that can be carried in a tank of given volume is probably dependent on a number of factors including oxygen content, temperature, salinity of the water, etc. On one vessel formerly operated in the commercial tuna fishery off Central America in

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ABSTRACTER: Edward A. Schaefers

3.4 THE GENERAL PRINCIPLES OF SMOKE-CURING OF FISH

Cutting, C. L. (Torry Research Station, Aberdeen, Scotland)
Food Investigation Leaflet 13, Department of Scientific and Industrial Research, London (1951), 16 pp.

To obtain a first class cure, only fresh fish in good condition should be used. "White" fish are in poor condition immediately before and after spawning and herring caught during the spring or out of the principal summer-autumn season are deficient in fat. White fish should be kept cold in ice before splitting and cleaning and should be cured within a week of catching. Herring should be smoked on the day of catching; after more than two days in ice they are not in the best condition for smoking.

Fish should be handled carefully to avoid bruising and tearing, and viscera, gills, membranes, and blood must be completely removed as they decompose more rapidly than the fish flesh. Most fish are cut, trimmed and cleaned before smoke-curing. Bloaters, "reds", and usually buckling are made from the whole herring. "Smokies" (hot-smoked haddock and whiting) although headed, are not split open. "White" fish, such as gutted haddock and codling are prepared for smoking as "pales" or "finnans" by heading, splitting from the belly all the way along the backbone to the tail fin by means of a sharp knife, and then cleaning.

For kippering, herring are split down the back and then gilled and gutted, leaving the head on and the belly walls intact. This operation is now done mainly by machine, which also washes away the blood and cleans the inside of the fish with running water.

Fish can be salted either by packing them in solid salt or by immersing them in a strong brine. By the former method, the salt, in addition to penetrating into the flesh, extracts water from the tissue, thus forming a saturated brine. This brine simply runs away as it is formed when the fish are "roused", i.e. mixed with salt in a pile on the floor. If the fish are dry-salted in a vat, a saturated

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ABSTRACTER: Kathryn L. Osterhaug

1.016 FISHERIES SURVEY OF THE MAURITIUS-SEYCHELLES AREA

Steven, G. A.
Nature 173, No. 4396, 186-187 (January 30, 1954)

A survey of the fisheries resources of the Mauritius-Seychelles region of the Indian Ocean was carried out during the two years 1948-49 by Dr. J. F. G. Wheeler and Dr. F. D. Ommanney. This survey was made possible by a Colonial Development and Welfare Research Grant.

Between the Seychelles and Mauritius and forming with them an arc of a circle, the center of which, six hundred miles away, is the north end of Madagascar, there is a chain of shallow banks which, except for a few isolated islets, are never uncovered by any tide. Forty-two cruises providing approximately 285.5 hours of fishing time were made with a 70-foot Scottish-type fishing vessel (M.F.R.V.1), to assess the potential fish resources on and around those banks. Ancillary observations were made in a schooner and certain other craft from the Seychelles and in small boats and pirogues at Mauritius.

It was found that the only fishable waters for demersal fish are on the banks themselves, as their edges fall away precipitously into great depths. In general, the best catches were made at depths of 8-42 fathoms, and the hand-line proved to be the most effective fishing instrument. It was demonstrated that catching rates of hand-lining equalled those of trawlers using trawling gear in normal trawling areas.

No method was discovered for capturing, on a profitable commercial scale, any of the pelagic fishes ranging from sailfishes and swordfishes down to anchovies, sardines etc. which were also found to be almost entirely restricted to waters inside the 100 fathom mark. Pelagic fishing is

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ABSTRACTER: Edward A. Schaefers

3.4

brine is formed which ultimately covers most of the fish. Herring for "redding" are salted in this way for 7-8 days if they are to be smoked immediately. They take up about 10 to 12 percent salt and lose about 15 percent by weight of liquid. Fish that are salted by dipping in brine change very little in over-all weight because the liquid which is first drawn out of the fish osmotically is replaced by saturated brine.

A salt content of at least 8 to 10 percent has a preservative effect against the action of molds and bacteria. However, the most popular cold-smoked products today, such as kippers and finnans, which are first split and then immersed in strong brine for no longer than half an hour, contain, after smoking, only 2 to 4 percent salt. This is suitable for normal palates, but has little effect on keeping quality. In special cures, such as smoked salmon and cod roes, sugar and also salt-petre are sometimes added to the brine during pickling. When dye is used it is usually incorporated in the brine.

There are two distinct types of smoking, depending on the amount of heat to which the fish are subjected. In "cold-smoking" the normal smoke temperature is not more than 85° F. and the smoked fish is not even partially cooked. In "hot-smoking" the heat in the kilns may rise at times to more than 200° F., which results in a partial sterilization of the flesh by heat. Subsequent reinfection and resultant spoilage of the cooked flesh is still quite rapid.

The type of wood burned to produce smoke varies from place to place. Shavings and sawdust of hard woods, particularly oak, are generally preferred to those of soft coniferous woods, such as fir, which give a marked color, but are apt to impart a resinous flavor to the fish.

After removal from the kiln the smoked fish should be cooled outside the kiln for at least half an hour before grading and packing. During this time a further 1-2 percent in weight is normally lost by evaporation. If packed while still warm, any deposition of moisture on the wrapping paper or box is liable to encourage premature mold growth.

1.016

therefore considered to hold fewer prospects of profitable development than bottom fish resources which are regarded as exploitable and adequate for local needs, and there could be an exportable surplus if an outlet on the East African mainland could be found and developed. At present the fish stocks of these areas are exploited only in a small measure over restricted areas near the inhabited islands.

2.115 (Cross Reference: 2.1127)

the Pacific Ocean, 300 and 400 scoops of bait (each containing about 12 pounds) were placed in deck tanks having a capacity of 4,100 and 6,130 gallons, respectively, exclusive of baffle and screen areas.

The design of screens in the bait tanks aboard a clipper is very important. Typical screens are made of 3/4-inch waterproof marine plywood with 1/8-inch slots cut by a circular saw on 1-inch centers. The deck bait tanks are of a general rectangular form to suit the available space, but the below-deck tanks (or wells) are vertical on 3 sides while the fourth side and bottom conform to the shape of the hull. The pumps for supplying sea water to the tanks are of the vertical-impeller type designed to deliver large volumes at low head pressures. It is considered best practice to have pumps with a performance capacity capable of delivering enough water to change the contents of the tanks 5 to 7 times per hour.

Most of the bait is taken in sheltered areas along the coasts of Mexico and Central America. Consequently, small boats are suitable and desirable, for the bait is frequently found in water too shallow or too dangerous for the clipper to enter. A power speedboat capable of speeds up to 30 or more miles per hour, a net skiff, and a "dry boat" are used to find and capture bait. Most of the bait is caught in hand-operated lampara nets varying from 130 to 160 fathoms in length and from 50 to 75 feet in depth at the bag. The end meshes in the wings vary from 5 to 8 inches (stretched measure) and gradually diminish in size to 1/2-inch (stretched measure) mesh in the bag. If the bait is caught in areas too shallow or hazardous for the clipper to approach, it is transferred to a collapsible receiver which can be towed.

A new type trap lift net for catching tuna bait fishes, operated from the vessel at night with lights to attract the schools of bait, eliminates the need for special bait boats and large bait seines, and appears promising for use by the commercial tuna fleet. This net has been developed by the technical staff of the U. S. Fish and Wildlife Service exploratory fishing vessel Oregon and has been extremely successful in catching anchovies and other small bait species in the Gulf of Mexico.

7.89 THE USE OF ULTRAVIOLET ("BLACK") LIGHT FOR DETERMINING QUALITY IN ICED SHRIMP

Lane, Charles E. and Whittaker, B. Edward
Special Service Bulletin No. 7, Marine Laboratory, University of Miami, Coral Gables (December, 1953)

A rapid and accurate method of testing the quality of iced shrimp is said to have been developed by scientists of the Marine Laboratory of the University of Miami, as part of the Laboratory's research program for the Florida State Board of Conservation, and for the Quality Control and Research Committee of the Shrimp Association of the Americas.

It was observed that the chitinous exoskeleton or shell of the shrimp was strongly fluorescent under ultraviolet ("black") light. This fluorescence is brilliant white and effectively hides any changes occurring in the underlying tissues. Freshly caught, peeled shrimp were found to exhibit a purple-blue fluorescence. Progressive changes in fluorescence were observed after varying periods of storage in ice. The purple-blue of the fresh shrimp was gradually replaced by an off-white fluorescence that increased in amount with length of time of storage. The white fluorescence appeared first at the anterior, or headed, end of the shrimp. This color was also observed at breaks in the shell or at the bases of the appendages.

The ultraviolet light source used in these experiments was one in which considerable visible light was also emitted. Peak transmission was at 2570 Å.

On the basis of these experiments any shrimp, when peeled and exposed to ultraviolet light in the neighborhood of 2570 Å, that exhibits brilliant white fluorescence of the tissue at the headed

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 ABSTRACTER: Roy C. Stevens

3.60 PRESERVATION BY FREEZE DRYING

Flosdorf, Earl W. (F. J. Stokes Machine Co., Philadelphia, Pa.)
Refrigerating Engineering 62, No. 3, 49-50, 117 (March, 1954)

Freeze drying is a relatively new application of low-temperature refrigeration in which the product is first frozen and then, under high vacuum, the ice is sublimed. The therapeutic effects of serum, blood plasma, various antibiotics, hormones, vaccines and other biological products are retained when dried by this process. In addition, many chemicals and pharmaceuticals are dried this way in order to improve their rate of solubility. Tests with a variety of commercial materials including fruit juices, milk, fish fillets, shrimp, steaks, and chops are also being carried out.

There are a number of advantages to drying the material while frozen, all of which give the method valuable applications and uses.

1. The temperature is below that at which many labile substances undergo chemical changes.
2. Because of the low temperature, the loss of volatile constituents is kept to a minimum.
3. Since the product is frozen, no changes due to surface action take place such as the surface denaturation of proteins in other types of drying.
4. The solute remains evenly dispersed and distributed without undergoing concentration, because the frozen solvent sublimes and the remaining dry residue emerges as a highly porous solid framework occupying essentially the same total space as the original solution. As a result, materials dried in this manner are extremely soluble.
5. Since the molecules of solute are virtually locked into position in this way, the tendency for coagulation of even lyophobic sols is reduced to a minimum.

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 ABSTRACTER: Roy C. Stevens

4.11 THE GLYCERIDE STRUCTURE OF NATURAL FATS. III. FACTORS GOVERNING THE CONTENT OF FULLY SATURATED GLYCERIDES

Kartha, A. R. S.
Journal of the American Oil Chemists' Society 31, No. 3, 85-88 (March, 1954)

In part I of this series, the author described a procedure for the quantitative determination in fats of the four glyceride types GS_3, GS_2U, GSU_2, and GU_3, where G equals the glyceryl radical, S equals saturated fatty acid (s) or saturated fatty acid group(s) according to context, and U equals unsaturated fatty acid(s) or unsaturated fatty acid group(s) according to context.

In part II, the author gave a rule for calculating the glyceride-type distribution in natural fats. It was based on the assumption that there is a maximum proportion of GS_3 that may be present in each species of fat. This limit varies, according to the circumstances, up to the proportion of GS_3 that may be produced by random or chance distribution of the component fatty acids among the glyceryl radicals. When the proportion of GS_3 that can exist is less than that that could be synthesized by chance distribution of the saturated fatty acids, the excess S is distributed according to chance among the remaining glyceryl radicals without formation of any more GS_3. In the present paper, some factors governing the quantity of GS_3 that may be present in the fat are discussed.

Any hypothesis accounting for glyceride-type distribution must explain the operation, with close accuracy, of the rule for calculation of the glyceride-type distribution in natural fats. It must also show how restriction of chance distribution, when this occurs, is effected. It must agree with the apparent fact that fatty acid synthesis and esterification take place in all vegetable-fat and animal-fat depots.

(over)

 ABSTRACTER: F. Bruce Sanford

2.115 SOME NORTH AMERICAN FISHING LAUNCHES

Chapelle, Howard I.
World Fishing 2, No. 11, 433 (November, 1953)

The following is the author's summary of a paper presented at the FAO-sponsored World Fishing Boat Congress, Paris, France and Miami, Florida, October, 1953.

Small craft, under 45 ft. in length, represent the largest part of the fishing fleets of Canada and the United States. The cost of these boats is the largest single investment of the fishing industries in floating equipment. Many fisheries are carried on entirely with small launches. Yet, in spite of the economic and industrial importance of the fishing launches, there has been little technical information published concerning their hull design, construction and powering practices.

The author here examines a few selected types of North American fishing launches with a view to showing just what natural evolution has produced to meet certain operating conditions. The point is made that small fishing launches do not lend themselves to academic analysis by mathematical comparisons; there is a very great range in hull forms, proportions and all elements between the very numerous types of craft as well as in a single type. Experience suggests that a great deal of the standard practices recommended in theoretical and academic naval architecture are of very dubious value in small craft design.

Emphasis in the discussion is placed upon wooden craft, for as yet, there is very little steel construction of small fishing launches in North America. These craft have, in fact, developed almost entirely from two distinct sources. One was the older local type of sailing fishing boat which has been adapted, or altered in more or less degree, to make it suitable for motor propulsion. The second source of fishing boat models is the high-speed pleasure launch.

(over)

 Author's summary

4.11

It must also agree with certain evidence that in adipose tissues as well as in mammary glands of animals, fat can be deposited from ingested foods without affecting the normal glyceride-type distribution. Kartha and Menon have shown that in buffalo-milk and cow-milk fats and in ox-depot fat, the ratio of GS_3 actual to GS_3 chance retains a value of very nearly unity in spite of variations in saturated acid content from about 50 percent to about 70 percent due to such factors as variation in food fat. The author has shown that samples of the same depot fats from different sources varying in saturated acid content, possibly because of differences in diet, all give analytical results in agreement with those obtained by the application of the rule for calculation of glyceride-type distribution.

Furthermore, in any hypothesis, the mechanism of esterification postulated must agree with the known specificites of the lipases affecting the esterification under normal in vivo conditions. It must also agree with the fact that lipolytic esterification is reversible and proceeds according to the law of mass action.

The paper can be summarized as follows:

The author presents experimental evidence from the literature to support the hypothesis that the GS_3 that may be present in natural fats cannot be in excess of the quantity that can exist in the fluid state in vivo. The author suggests that solid fat is not produced in vivo because the mode of action of lipolytic enzymes allows them to form only liquid fats.

2.115

Among the specific types of launch discussed are the Gaspe boat (Gaspe Peninsular, Quebec), which is an example of a powered fishing boat developed entirely by slight modifications in an older sailing model. These craft are economical to operate, although the author gives it as his opinion that a lighter engine of somewhat greater power would have advantages, while it would seem desirable to retain the sailing rig. It is said the craft would be well suited for fisheries in primitive areas, such as the coast of northern Labrador. The Cape Island boat is undoubtedly the most popular model of fishing launch in Nova Scotia and New Brunswick, Canada, and New England, U.S.A., in the last-named area the type is called the Jonesport boat. Other types dealt with in detail, in the main from the point of view of construction, are the Seabright skiff (New Jersey); the Sharpie launch (Long Island Sound, Mississippi River, Chesapeake Bay); the scow or garvey (New Jersey, Maryland, Virginia); beach landing scow or garvey for trapfishing (Virginia); and Hooper Island launches (Chesapeake Bay).

The installation of pilot houses and steering shelters is discussed. In recent years in the United States, most types of fishing launches have had pilot houses or semi-enclosed steering positions fitted. In the larger boats, the wholly enclosed pilot house can be justified, but in the smaller launches such as lobster and oyster boats it is very doubtful if these serve a useful uurpose. Other questions dealt with are safety (it is said that one of the gravest dangers in most fishing launches in North America are petrol explosions caused by leaks in the fuel tank or piping), and the powering of the craft. This latter is said to be an almost unexplored field. Among the fishing launches of North America a very small proportion only have engines built for marine use; the greater number have car engines of almost every known American make or vintage. A discussion is, therefore, made of the performance of these engines in various types of launches, including the possibility of installing manually started Diesels in small launches.

Among the conclusions reached by the author are that it is easy and popular to overdo mechanisation and thus produce too complicated a boat for the work of fishing; that the average fishing launch costs too much, in proportion to the income she produces over a period of years, and that there is altogether too much emphasis on high speed in fishing launches. He sums up by saying that the problems surrounding the improvement of all small fishing craft are not the simple ones of mere technical improvement.

7.89 (Cross References: 2.01, 1.85)

end, or elsewhere, may be graded as spoiled or rapidly spoiling. The onset of spoilage is first indicated by a faint white fluorescence in the headed region. The authors found this to occur in from six to ten days when the shrimp had been held in "Rickey" type ice.

This method is expected to meet one of the most urgent needs of the shrimp industry.

3.60

6. Because a far lower moisture content may be obtained in the final product by this method without the use of excessively high final temperature, a greater degree of stability may be obtained than by any other method of drying.
7. Bacterial growth and enzymatic change cannot take place under the frozen conditions of drying.
8. Even the most readily oxidizable constituents are protected due to the high vacuum used.

Two stages are involved in drying by sublimation. Ice is first evaporated from a frozen mass. Some 98 to 99% of all water is removed, depending upon the particular product. In the second stage, moisture is removed from the final dry solid to reduce the residual content to a minimal level of 0.5% or less. Assuming 10% solids originally, this represents a removal of 99.95% of the original content of water. During the first stage, temperatures are far below the freezing point. Arriving at the second stage, the temperature rises and finally reaches that of the room or higher depending upon the final ambient temperature used.

3.14 EFFECT OF SALT ON THE STORAGE LIFE OF SALMON EGGS PRESERVED WITH SODIUM BISULFITE

Landgraf, R. G. Jr.
Commercial Fisheries Review 16, No. 2, 13-15 (February, 1954)

Salmon eggs from mature chum salmon (Oncorhynchus keta) and pink salmon (Oncorhynchus gorbuscha) were collected from a cannery where fresh water was used for fluming the salmon waste to conveyor belts. Chum salmon eggs made up about 80 percent of the mixture.

Two series of preserved salmon eggs were prepared in 30-pound berry tins as follows: (1) In series I, the sodium bisulfite was weighed into a beaker, and a portion was sprinkled from the beaker onto the bottom of the tin. Eggs were then added with a scoop with a capacity of approximately 5 pounds, and a small amount of preservative was sprinkled over the eggs after each scoop. When the tin was approximately half full, the eggs and sodium bisulfite were thoroughly mixed. After the tin was filled with 30 pounds of eggs, the eggs and sodium bisulfite were mixed again. In this series 4 lots of 5 tins each were prepared, and the only variable between the lots was the concentration of sodium bisulfite as listed in the table. (2) Series II was identical with series I with the exception that 2 percent salt was also added in addition to the sodium bisulfite.

All samples of the preserved eggs were stored in an unheated building where the temperatures ranged from 35° F. to 61° F., with an average temperature of 50° F. One tin from each lot was examined at the end of 2, 4, 7, 10, and 15 weeks for surface mold, odor, color, general condition, and free liquid. The results of the examination are given in table 1 (this card, over).

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 ABSTRACTER: D. T. Miyauchi

0.6 FOOD FROM THE SEA

Weiss, Francis Joseph
Journal of Agricultural and Food Chemistry 1, No. 13, 822-828 (September 16, 1953)

Fish and shellfish are said to contribute about 2 percent of the total food consumption of the world's human population. Approximately 90 percent of this amount is taken from the waters of the northern hemisphere, while the much greater ocean areas of the southern hemisphere have been essentially untouched. The author discusses some of the many types of highly nutritious foodstuffs that could be harvested from the sea in large quantities.

An acre of sea is estimated to produce almost three times as much as an acre of land, and since more than 71 percent of the earth's surface is covered with water, this great potential food resource deserves careful consideration. It is calculated that some 13.5×10^{10} tons of carbon are fixed each year as a result of photosynthesis.

Due to their high mineral content, seaweeds have found wide use as fertilizers and soil-conditioners. They have also been used for many years as an animal food. The water-soluble polysaccharides of the larger brown algae are used increasingly as stabilizers in food industries. It has recently been discovered that some algal tissues have a strong antibiotic action. This discovery has raised the question as to whether it is the presence of the antibiotic substances in seaweeds or their high mineral content that makes them such valuable supplementary foods for cattle. Another recent application of seaweed in the food industry is its use in the production of an edible sausage casing that is in many ways preferable to cellophane and weighs only one-twenty-ninth as much.

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 ABSTRACTER: Roy C. Stevens

2.115 THE INFLUENCE OF OPERATIONAL FACTORS ON THE DESIGN OF A MODERN TUNA CLIPPER

Petrich, James F.
World Fishing 2, No. 11, 433-34 (November, 1953)

The following is the author's summary of a paper presented at the FAO-sponsored World Fishing Boat Congress, Paris, France and Miami, Florida, October, 1953.

The author begins by recalling the early days of tuna fishing off Southern California before the 1920's, when fishermen learned to attract the schools of tuna to their boats by throwing out live bait, small sardines or anchovies, which they found in abundance along the coast. The tuna thus lured would churn and boil the water in their strikes for the bait and in this frenzy of excitement would also strike at the feathered hooks held there in the water on a short line at the end of bamboo poles by the fishermen. Since those days the tuna fishery has expanded to include the waters off the west coast of Mexico and Central America and the north-west coast of South America. The fishing boat has developed from the small flush deck launch without living accommodation, and able only to make daily trips out of port, to the modern high seas tuna clipper able to travel 10,000-12,000 miles, although fishing methods have remained the same. This latter consideration is, therefore, the one around which revolves the whole design of the modern tuna clipper.

A full description is given of the modern vessel, which is built in either steel or wood, although the wood-constructed vessel is preferred by the majority of fishermen, due to corrosion problems in warm tropical waters with the steel.

The tuna fisherman has found from the first that, in order to fish effectively and brace himself against the impact of a tuna striking at his hook, and to have enough leverage to lift the heavy fish out

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 Author's summary

5.112 EFFECT OF ADDED STABILIZED ANIMAL FATS ON STABILITY OF VITAMIN A IN FEEDS

Siedler, A. J. and Schweigert, B. S.
Journal of Agricultural and Food Chemistry 2, No. 4, 193-195 (February 17, 1954)

The authors found that the evaluation of the effects of antioxidant-treated fat on the stability of the vitamin A in a feed was important in the course of studies on the effect of adding fat, stabilized with antioxidants, on the growth rate and the food and caloric utilization by dogs and chicks. Correlative studies on comparable feeds with stabilized fat added have shown that the added fat does not become rancid even after storage for one year at room temperature.

Buxton, Dyme and his associates, and Sandell have shown that the vitamin A destruction generally parallels the rise in peroxide value of the vitamin carrier. Increased stability of vitamin A when antioxidants have been added has been observed by a number of workers. In the present study, the authors investigated the effect of stabilized animal fat added to dry dog meals on the stability of vitamin A during storage at room temperature.

The experimental feed used in these studies was a dry dog meal similar in composition to commercial dry meals. The vitamin A source was a commercial fish liver oil that was blended either directly into the meal (control meal) or was dissolved previous to being blended in a weighed amount of stabilized fat equal to 6 percent of the weight of the dry meal.

The animal fat (choice white grease, a high grade of inedible pork fat) was stabilized by the addition of butylated hydroxyanisole (0.02%), citric acid (0.01%), and propyl gallate (0.005%) to the melted fat at 80° C.

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 ABSTRACTER: F. Bruce Sanford

2.115

of the water past his shoulder and into the boat, he must be standing only a few inches above the surface of the water. He stands in steel racks, hung outside the rail around the stern of the boat, in order to be able to trail his hook as far out from the hull as possible. This also leaves the space behind him on the deck free to receive the fish which he catches.

It has worked out best to have the fish racks at the same level as the deck, and to have the height of the rail behind the fishermen in the racks to reach to the same height as his buttocks; and then to trim the ship with just a few inches of freeboard at the stern. "Safe and seaworthy" may appear to some incongruous with but a few inches of freeboard, but in a real sense the low freeboard tuna clipper design is no more dangerous than the low freeboard oil tanker that plies the oceans.

There have been times, however, when some tuna clippers were built very unstable and unsafe, when in an effort to make a more efficient fishing boat the fundamental features of stability for the sea-going vessel were forsaken.

Over the years, the need for greater bait carrying capacity increased proportionately to the size of the boat. The author discussed the method of carrying live bait, and the requirements thus imposed upon clipper designs. A further problem dealt with is the refrigeration of the catch. The early long-range clipper carried crushed ice in its hold to preserve the fish and used ammonia refrigeration coils banked overhead and on the sides and bulkheads of the hold to supplement the cooling effect of the ice and overcome the heat absorbed through the hull. Some fishermen tried a method of circulating chilled sea water to preserve the tuna in the forward box, and this proved so satisfactory that soon all the tuna clippers were converting their water-tight walls and forward boxes to this type of freezing. A brine cooler was installed on deck through which the ammonia refrigerant was used to cool the sea water that was circulated constantly between it and the walls or boxes that were being chilled.

In the 1930's some brine boats were built, having the entire hold divided into water-tight compartments so that the entire catch could be frozen "in brine". The popularity of this method was immediately established, and with certain refinements (in particular the procedure whereby the fish are carried in "dry wells") this method is in operation today.

3.14

The results of this experiment indicate the following:

1. With sodium bisulfite concentrations less than sufficient to preserve the eggs (0.25 percent), the addition of 2-percent salt does not appreciably affect their storage life.
2. With sodium bisulfite concentrations just sufficient to preserve the eggs (0.5 percent), the addition of the salt (2 percent) decreases their storage life.
3. With concentrations somewhat greater than just sufficient to preserve the eggs (0.75 to 1.0 percent), the addition of salt (2 percent) tends to increase their storage life and has a beneficial effect on their appearance and general condition.

Effect of Sodium Chloride on the Storage Life of Salmon Eggs Preserved with Sodium Bisulfite

Lot Number	Amount of Sodium Bisulfite	Amount of Sodium Chloride	Storage Life
	Percent	Percent	Weeks
IA	0.25	0	2
IIA	0.25	2	2
IB	0.50	0	10
IIB	0.50	2	2
IC	0.75	0	15
IIC	0.75	2	greater than 15
ID	1.0	0	greater than 15
IID	1.0	2	greater than 15

NOTE: ALTHOUGH IIC, ID, AND IID WERE ALL IN ACCEPTABLE CONDITION AT THE END OF 15 WEEKS OF STORAGE, THERE WAS A MARKED DIFFERENCE IN THE APPEARANCE AND GENERAL CONDITION OF THE PRESERVED SALMON EGGS FROM THESE THREE LOTS. THEY WERE RATED IN THE ORDER IID, IIC, AND ID, WITH IID BEING THE BEST.

5.112

The experimental meals (either with or without 6% fat added at the expense of the entire ration) were stored in one-pound glassine-lined paper bags at about 78° F. Two series of duplicate samples were stored for approximately one year and assayed for vitamin A at intervals throughout the storage period. The chromatographic method for the determination of vitamin A in mixed feeds as reported by Schaeffer was the method used.

The authors found that the chemical determination of vitamin A in these meals was satisfactory as judged by comparison with a saponification procedure, duplicability and agreement of results, and recoveries of internal standard.

The results of the two series of storage tests showed that adding 6% stabilized fat increased the stability of the fish-liver-oil vitamin A in the meal.

0.6 (Cross Reference: 6.3)

The larger marine algae or seaweed mentioned above constitute only one percent of the total marine vegetation. The greater part of sea-growth plant life consists of microscopic phytoplankton (mainly diatoms and dinoflagellates). The food chain that leads from these microscopic plants through the zooplankton, the crustaceans, through approximately two sizes of small fish to the large marine fish, such as the cod, is a long and wasteful one. It has been calculated that each pound of fish flesh represents about 100,000 pounds of sea plants. Mr. Weiss feels that this waste indicates the need for a more efficient use of the lower forms of marine life instead of dependence on the long chain from plankton to fish.

The dry substance of zooplankton has an average composition of 59 percent protein, 7 percent fat, 20 percent carbohydrate, 4.7 percent chitin and 9.4 percent ash. It is said to have a delicate shrimp-like flavor and to be suitable for human food. Possible means of taking these organisms in commercial quantities are described.

Mussel farms along the French coast are said to produce 10,000 pounds of mussel meat per acre per year as compared with 190 pounds of beef per acre obtainable from the finest pasture.

The author points out that one of the main drawbacks to the utilization of the nutritious marine crop is the fact that it is a perishable one and that much research is needed in marine chemistry to develop the most desirable methods for preservation and distribution of these food products.

6.139 VITAMIN CONTENT OF FISHERY BYPRODUCTS. PART 1. EFFECT OF PROCESSING METHODS ON RIBOFLAVIN, NICOTINIC ACID, AND VITAMIN B_{12} CONTENT OF SOLUBLES AND MEAL

Karrick, N. L. and Stansby, M. E.
Commercial Fisheries Review 16, No. 2, 7-10 (February 1954)

Samples of presscake, of meal prepared from the presscake, and of stickwater from the press were analyzed, using microbiological assays, for their riboflavin, nicotinic acid and vitamin B_{12} contents. Moisture and oil determinations were also made. These analyses were made to obtain data on the effect of processing on the vitamins and on the distribution of vitamins between the meal and solubles. The samples were obtained from three plants and were dried (A) in a direct flame dryer (B) in an indirect flame dryer (approximately 250° F.) and (C) in an air-lift dryer (approximately 175° F.).

To check variation during a day's run, five samples each of presscake and meal were taken at different times during the day. The replicate samples of presscake and meal (A) and of meal (C) were analyzed individually. The only instance of considerable variation was the amount of riboflavin in the presscake samples.

The results of the analyses of the presscake and meal prepared from the presscake in the different dryers are shown in table 2 (this card, over).

There was no significant loss of the vitamins except in the nicotinic acid content of the direct flame-dried meal.

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 ABSTRACTER: Neva L. Karrick

1.85 POTTED SHRIMPS

Walker, Leonard
Food Manufacture 29, No. 2, 68-69 (February, 1954)

Two varieties of shrimp are caught in Britain: the "brown" shrimp and the "pink" shrimp. Only the brown shrimp are used in the potted shrimp industry since the pink shrimp have a rather tough and oily flesh that makes them unsuitable for this product.

One of the oldest firms in the business operates its own fleet of shrimp boats along the west coast from Southport in Lancashire to Kirkcudbright in Scotland. On the Lancashire coast, where the slope of the sea bed is gradual, horse-drawn carts drawing a conical net are also used. It is essential that the shrimp used in the product be caught on clean sand free from mud. These conditions exist on the west coast.

The fishermen are largely responsible for the quality of the final product. The shrimp are sorted and boiled in large kettles aboard the vessels. The color of the shell of a properly boiled shrimp changes from green to bronze, and the tail curls neatly toward the head. Proper cooking is essential in order to avoid the production of straight, soft shrimp, unsuitable for processing.

On arrival at the plant the shrimp are dumped along the center of a long table. Operators on either side place their output of about 1 1/2 pounds each of peeled shrimp per hour into shallow pans. The amount peeled by each picker is weighed by a supervisor who then passes the shrimp meats on to the cook. The peeled shrimps are cooked in hot butter. After a sufficient period, the mixture is ladled into screw-top waxed cartons which, when the contents have set, are screwed up, wrapped in grease-proof paper and stacked in cardboard boxes.

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 ABSTRACTER: Roy C. Stevens

1.0144 SWEDISH FISHING: A WORKING DEMOCRACY

Anonymous
World Fishing 3, No. 1, 22-23 (January, 1954)

The fishing economy of the province of Bohuslan on the southwest coast of Sweden is centered around the plentiful stocks of herring, cod, haddock, whiting, mackerel, etc. that are found in this area.

A century ago, Bohuslan fishermen used to make their own gear and process their own catches. The modern influence of the American ring net, the British otter trawl, the Danish seine and two-boat deep-sea trawl, and up-to-date navigational aids has helped adapt this area to present-day conditions.

In olden days, family groups or even whole communities pooled their equipment and divided the catches on a predetermined "man lot" and "boat lot" basis. Today, with larger boats that are quite expensive and capable of remaining at sea longer, fishing is still done on a partnership basis. Two or more men to into partnership on a cutter; typically an 80-foot long, 21-foot wide, 12-foot deep, 97-ton sturdy oak-timbered vessel with a 300-h. p. diesel engine. Instead of dividing up the catch as before, the fishermen now sell their catches at auction and then split up the profits after expenses.

The Swedish West Coast Fishermen's Association, with 6,363 members divided into 50 locals and operating 1,320 ships, has helped to solve problems of efficient and equitable fishing and marketing methods. The Association establishes fishing regulations dealing with type of gear, size and quality of fish, and size of catches. It also compiles statistics on operating costs so that initial

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 ABSTRACTER: M. R. Greenwood

2.115 NEW MATERIALS IN FISHING VESSEL CONSTRUCTION AND OPERATION

Goldsworthy, E. C.
World Fishing 2, No. 11, 431 (November, 1953)

The following is the author's summary of a paper presented at the FAO-sponsored World Fishing Boat Congress, Paris, France and Miami, Florida, October, 1953.

Within recent years a minor revolution has taken place in the materials used in fishing vessel construction, items of fishing equipment, fish-hold linings and so on. These changes are discussed under three main headings: structural and semi-structural applications; insulation; and miscellaneous equipment.

Chief among the structural materials, aluminium alloys have found increasing applications in the superstructures of vessels, thus saving weight and improving stability, and owing to their freedom from corrosion, reducing cost of upkeep and increasing overall life. Riveting is the normal method of joining, but welding with the Argon arc is fast becoming standard practice. Aluminium has also proved to be a suitable material for lining fish-holds.

The search for lightweight non-hydroscopic non-inflammable insulating material has never ceased, and cork, once supreme, has been superseded by other materials derived from glass, cellulose acetate, or rubber.

Under the heading miscellaneous equipment, aluminium is once again prominent, having found application in fish-hold pound boards, para-otters for stern trawling, floats, and deck tread plates.

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 Author's summary

VITAMIN CHANGES DURING MEAL PROCESSING

SWEDISH FISHING

POTTED SHRIMP

NEW MATERIALS IN VESSEL CONSTRUCTION

1.0144

bidding points at auctions can be set. Finally, the Association operates cooperative packing plants and marketing agencies.

2.115

Nylon cordage is being used in some vessels as, despite higher initial cost, its strength is twice that of the best manilla.

New materials are also discussed in relation to accommodation, and here rubber in various forms is used extensively. Cabin bulkheads and furniture may now be constructed from synthetic materials derived from a mixture of wood fibres and a synthetic resin; easy to cut and form, these materials are said to be resistant to water, oil and acids, and have good fire-resisting properties.

6.139 (Cross Reference: 8.64)

To calculate the distribution of the three vitamins between meal and solubles, the ratio of 400 pounds of meal to 165 pounds of solubles (50 percent solids) was used. The results are shown in table 3, omitted.

Of the total amount of the three vitamins in the meal and solubles, an over-all average of 59 percent was in the solubles and 41 percent in the meals.

Table 2--Composition of Press Cake and of the Corresponding Meals in Different Types of Dryers

Plant Code	Type of Dryer	Raw Material	Processed Material	Composition of Sample[1]				
				Moisture	Oil	Vitamins (moisture- and oil-free basis)		
						Riboflavin	Nicotinic Acid	B12
				Percent	Percent	Micrograms Per Gram	Micrograms Per Gram	Micrograms Per Gram
A	Direct flame dryer	Pilchard and mackerel canning scrap	Press cake	56.5	5.55	4.7	90	0.33
			Meal	8.4	8.57	4.5	66	0.29
B	Indirect flame dryer (app. 250° F.)	Whole pilchard	Press cake	53.6	4.80	3.8	82	0.23
			Meal	7.5	7.85	3.8	80	0.24
C	Air-lift dryer (app. 175° F.)	Pilchard scrap	Press cake	49.5	4.11	2.8	30	0.18
			Meal	13.3	6.96	2.6	42	0.22

1/ DATA FOR A PRESS CAKE AND MEAL, AND FOR C MEAL REPRESENT THE AVERAGE OF FIVE INDIVIDUAL SAMPLES TAKEN DURING THE COURSE OF ONE DAY'S OPERATION IN A PLANT. DATA FOR B PRESS CAKE AND MEAL, AND FOR C PRESS CAKE REPRESENT THE AVERAGE VALUES FOR COMPOSITE SAMPLES PREPARED BY COMBINING FIVE SAMPLES TAKEN DURING THE COURSE OF A DAY'S PLANT OPERATION.

1.85

Because of the extremely perishable nature of the product, it is essential that the distribution, sale, and consumption take place as quickly as possible after packing. Shipments are sent by passenger train to the company's London office for distribution. Cartons to individuals are sent by parcel post.

2.117 FISHERY RESEARCH VESSEL "SARSIA"

Anonymous
World Fishing 3, No. 1, 35-37 (January, 1954)

The Sarsia was built for the Marine Biological Association of the United Kingdom, Plymouth, for comprehensive marine biological and oceanographical research. It is 128 feet (o.a.) long, 28 feet (moulded) wide, 13 feet (moulded) deep, and designed to travel at 10 knots. Vibration was nearly eliminated by robust and continuous construction and by resiliently mounting all engines.

Berth accommodations are provided for 5 officers, 11 crewmen, and 4 scientists. Cabins have hot and cold running water, mechanical ventilation, and hot-water radiators. There is a 20-foot lifeboat, a 21-foot motor lifeboat, and a working dinghy. A storeroom for oceanographic gear is located in the forecastle. There are two cold storage chambers for scientific purposes and one for domestic use.

The vessel is fitted as a first-class trawler with starboard gallows and a three-drum winch -- two with 500 fathoms of 2 1/2-inch wire and one with 2,000 fathoms of 1 1/2-inch wire. In addition, there are two oceanographic winches -- one in the forecastle with 3 miles of 4-mm. wire equipped with a depth-recording davit, and one on the aft end of the deckhouse with 1/2 mile of 6-mm. wire operating through a sliding extending boom on the after derrick over the stern.

There are two fixed and several portable live-tanks on the port side of the main deck.

There are two laboratories: the main one at the forward end of the main deckhouse, and the rough or wet one at the aft end of the main deckhouse. Laboratory equipment includes: special

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 ABSTRACTER: M. R. Greenwood

5.112 THE STABILITY OF VITAMIN A IN ANIMAL FEEDING-STUFFS

Davies, Alan W. and Alastair, N. W.
Journal of the Science of Food and Agriculture 5, No. 2, 107-112 (February, 1954)

The present studies form part of a long-term research project that is still in progress. This report deals with observations that have been made on (1) the effect of particle size of the mash, temperature, light, air, and specific ingredients, on the destruction of vitamin A in added cod liver oil; (2) the effect of preparing the diet in cubes on the stability of added synthetic vitamin A; and (3) the protective value of gelatin.

The authors found that under a wide variety of storage conditions, the loss of vitamin A was greater in a ration of coarse particle size than in a ration of medium particle size. On the other hand, they found that cubing protected the vitamin A from destruction and that this protective action was even greater for carotene. The adverse effect on vitamin A stability of incorporating mineral salts with the ration, without taking steps to prevent their coming in close contact with the vitamin, was confirmed. Some natural foodstuffs appeared to assert a protective action. Loss of vitamin A occurred more slowly in the presence of either fish meal or liver meal than in the presence of various cereal products. Dried brewers' yeast did not confer any protection, however, and the loss of vitamin A in its presence appeared to be more rapid than in the presence of the cereal products. The protective value of gelatin was demonstrated even in the presence of mineral salts that otherwise promoted rapid destruction of the vitamin.

In an examination of a cod-liver-oil emulsion that had been stored on a shelf for 10 years, the authors found that the vitamin A content was still almost 60 percent of that present at the time of manufacture. No trace of the pink color indicative of oxidation was found during the vitamin A analysis.

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 ABSTRACTER: F. Bruce Sanford

2.115 THE STABILITY OF FISHING VESSELS

Nickum, George C.
World Fishing 3, No. 1, 39 (January, 1954)

The following is the author's summary of a paper presented at the FAO-sponsored World Fishing Boat Congress, Paris, France and Miami, Florida, October, 1953.

It has been only in comparatively recent times that man has applied his scientific tools to the problems of ship stability and arrived at means and methods by which the stability of a vessel could be accurately foretold and a criterion set up against which the stability of any type of vessel could be measured. These methods, however, have generally been applied only to the larger ships and as ship technology has advanced, far from simplifying the problem of determination of stability, modern methods have been forced by the very nature of the problem into complications and elaborations which further limit, by economic reasons, the application of these methods to the larger vessels. The vast majority of the various floating structures in the world today are built without any analysis of stability other than the old empirical question, "Has it turned over yet?" This, says the author, is particularly true of the world's fishing fleet.

A criterion of stability established for use in fishing vessels must meet definite requirements. First, it must be of such a nature that the designer may readily forecast a new vessel's compliance with the criterion without requiring elaborate and expensive calculations. Second, the criterion must be such that simple tests by relatively untrained personnel can verify the compliance of any fishing vessel with the criterion without requiring the availability of design plans.

The author then goes on to propose a criterion as follows: (1) The vessel, in its most severe operating condition, must have the following characteristics:

(over)

 Author's summary

6.193 UNIDENTIFIED GROWTH FACTORS REQUIRED BY CHICKS AND POULTS. 3. CHICK STUDIES INVOLVING PRACTICAL-TYPE RATIONS

Combs, G. F.; Arscott, G. H.; and Jones. H. L. (Department of Poultry Husbandry, University of Maryland, College Park)
Poultry Science 33, No. 1, 71-79 (January, 1954)

Further evidence is presented indicating that two unidentified growth factors are needed by chicks fed practical-type rations with and without antibiotics. One unidentified growth factor is present in certain liver preparations, fish meal, fish solubles, whale solubles, crab meal and meat scraps. The second factor appears to be supplied by dried whey products, butyl molasses fermentation solubles, butyl grain fermentation solubles, molasses distillers' dried solubles and dried brewers' yeast.

The basal ration used in the experiments was composed of practical ingredients, containing a high level of yellow corn and soybean oil meal. The rations were adequate in known nutrients required for chick growth. Day-old chicks were used in the experiments and they were maintained on the rations for 8 weeks.

It was found that a significant increase in growth response was obtained when the basal diet was supplemented with menhaden fish meal at 2.5 percent and 5 percent or with butyl molasses fermentation solubles at levels of 1, 2 or 4 percent. Furthermore, combinations of these substances produced growth responses greater than was produced by either alone.

In other experiments it was found that the presence of procaine penicillin G or aureomycin HCl in the ration exerted a sparing effect on the chick requirements for the unidentified growth factors.

 ABSTRACTER: W. N. Sumerwell

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(a) GM equal to or greater than either 0.10B or 2 ft. (61 cm.), (b) $\frac{F}{B} + \frac{FA}{L \times B}$ equal to or greater than 0.15

Where: GM = the distance between the centre of gravity of the vessel and the transverse metacentre; B = the beam in feet over the planking or plating measured at the broadest part of the vessel at the waterline; F = the freeboard in feet from the waterline to the edge of the freeboard deck at the side measured amidships; FA = equals freeboard area in sq. feet (projected on a vertical plane through the centreline) between the waterline and the freeboard deck at the side; L = the registered length.

(2) Compliance with the above characteristics must be proved by physical measurements with the vessel in its most severe operating condition. GM is to be calculated from actual measurements or period of roll in this condition, using the following formula:

$$GM = \sqrt{\frac{m\,B}{t^2}}$$

Where: m = 0.40
t = time, in seconds, for one complete roll from maximum heel to one side to maximum heel to the other side and return.

In proposing this criterion, the author is conscious of the fact that the proposal is based on experience with a limited type of fishing vessel. The fact is that all the data used in arriving at the factors of GM, freeboard and rolling period come from Pacific coast type vessels, and while it is considered that the proposed criterion would probably not be applicable to every fishing vessel throughout the world, the GM requirements would certainly seem to be applicable at least to European trawlers and draggers.

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lighting, shelving, specimen box racks, cupboards, bottle drawers, chemical reagent distribution, gimbal table, sinks, microscopic mountings, and electronic gear with a 6 to 36 volt capacity.

Special equipment in the wheelhouse and chartroom includes: radar, shallow echo-sounder, deep-sea echo-sounder, recording echometer, and radio-telephone.

The main power plant is an English-made, 6-cylinder, pressure-charged, 4-stroke, diesel engine which can develop 270 s.h.p. at 450 r.p.m. through reverse-reduction gears of 3:1 ratio. Slow speeds for fine-net trawling are obtained by the use of a 20-h.p. variable-speed electric motor geared into the propeller shaft through the main gear box.

There are two auxiliary generator sets. One, a 60-kw. generator, is driven from the same, 165-b.h.p. diesel engine used to power the trawling winch. The other, with a 35-kw. capacity, is driven by a 60-b.h.p. diesel engine that is also used to drive an air compressor. There are two electrically-driven 19-tons-per-hour bilge pumps and a stand-by lubricating oil pump.

The steering gear is a combined power and hand electro-hydraulic type. The vessel attained the contracted speed of 10 knots at 156 revolutions on trial run.

5.112

Under the conditions of the experimental work, the authors found that the stability of vitamin A palmitate in a commercial premix was considerably greater than that of the vitamin A in cod liver oil. From these results and those of various unpublished experiments in progress elsewhere, it is apparent that the relative stability of synthetic vitamin A and of vitamin A in cod liver oil shows considerable variation in different circumstances. Without precise information on the nature of the factors that facilitate or retard the destruction of the vitamin, this variation is difficult to interpret, although satisfactory preparation of the premix is obviously of great importance. The authors conclude it would be advisable to determine the best source of vitamin A and the means of protecting it against destruction by actual tests employing the ingredients in question. They emphasize that the value of adding cod liver oil does not lie solely in its vitamin A content. The farmer is advised whenever possible to purchase cod liver oil as such and to add it to the ration immediately before feeding. The authors point out that a spray gun is suitable for this purpose.

2.118 DEEP FREEZE FACTORY SHIPS

Cunningham, D. B.
World Fishing 3, No. 2, 81 (February, 1954)

In appreciating the design of a factory ship, two salient points must be observed: (a) what quantity of quick frozen fish the owner requires to be processed during the voyage; and (b) in what time as regards the number of days at sea has this to be carried out. The size of each vessel is determined also by the area in which it is intended to operate; the salient design features are discussed.

As far as crew are concerned, on a factory ship they can roughly be divided into three categories: (a) the navigating crew and operating personnel to run the vessel as a seagoing ship; (b) the crew necessary actually to shoot and recover the nets during fishing operations; and (c) the workers on board the vessel who operate below decks to process and freeze the fish and who are called the factory deck workers. It is suggested that all three departments should be controlled by separate officers, namely: navigating captain, fishing skipper and factory deck manager. The navigating captain and his crew take the vessel to the fishing grounds, and on arrival at the pre-determined spot the fishing skipper and his crew take over the vessel and maintain control from the fishing bridge during fishing operations. Should any sudden emergency occur which might effect the safety of the vessel, the vessel would be immediately taken over by the navigating captain. Below decks the factory deck manager is responsible for the processing of the fish and offal. When his duties are completed, the fish products come under the care of the navigating captain.

A description is given of the fishing operations (in a factory ship of this kind trawling is through a chute in the stern). During the shooting or hauling operations the fishing bridge maintains control of the ship, including instructions to engine room and trawl winch. During the actual trawling the

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Author's summary

3.33 NEW TWIST IN H-S RETORTING

Borges, J. M. and Desrosier, N. W. (Agric. Exp. Station, Purdue University, Lafayette)
Food Engineering 26, No. 1, 54, 153, 155 (January, 1954)

An experimental cooker was designed in which the cans are subjected to a combination of horizontal and vertical rotations simultaneously. This new movement, which the authors call "Multi-Action", increases the number of turbulent headspace migrations within the containers and therefore further improves heat penetration over the systems used at the present time.

In the experimental cooker, an enclosed shaft-borne yoke and can-bearing frame driven by an external motor are constructed inside a standard horizontal pressure retort shell. The yoke and frame in the shell move with a free spinning and rotating action. In its present use the end-over-end speed of 32 r.p.m. and a spinning rotation of 128 r.p.m. are found to be adequate maxima.

Processing results in the experimental retort showed an improved efficiency in killing heat-resistant spores of food spoilage bacteria for any given process. The results from tests on various combinations of speeds indicate that there are practical limits to "Multi-Action"; a treatment at 128 r.p.m. rotating and 32 r.p.m. end-over-end was less effective than an 84-r.p.m. rotating and 18.5-r.p.m. end-over-end treatment, under the conditions evaluated.

In a study to evaluate the effect of this process on quality, some fresh tomato juice was processed and its color depression measured with a Hunter Meter. The following processes at 254°F. were about equally effective in holding color:

1. 2.5-minute cook using an 84-r.p.m. rotating and 18.5-r.p.m. end-over-end treatment.

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ABSTRACTER: D. T. Miyauchi

3.33 FISH HANDLING AND PROCESSING IN U.S.A.: CANNING MAINE SARDINES

Empey, W. A.
Fisheries Newsletter (Australia) 12, No. 11, 13 (November, 1953)

On the Atlantic Coast, small herring (Clupea harengus) are canned as sardines. The fish are caught in trap nets or seines and held for at least 24 hours before being transported to the factories. The distance from fishing grounds to cannery varies from less than a mile to about 100 miles.

The fish are removed from the traps or seines by means of power-operated dip-nets and transferred to the water-tight holds of the transport vessels. They are not iced for fear of bruising, but if they are to be held in the holds more than a very short time they are salted at the rate of 300 pounds salt to 1200 pounds fish.

The fish are unloaded at the canneries by means of large buckets or by the use of suction pumps after the holds are partially flooded. They are then flumed with sea water to concrete storage bins where they are brined. During fluming, the fish are scaled either by passing over metal gratings or through a wire mesh scaler. The scales rubbed off on the boats are recovered from the false floor of the holds and used as raw material for manufacturing pearl essence and for making foaming agents for fire extinguishers.

The best fish for canning are small with a fairly high oil content and are free from "feed." In dressing, the head and viscera are removed in one operation. Brining is carried out in wooden tanks with 90° salinometer brine for between 20 minutes and three hours, depending on the size of the fish, whether they are whole or cut, and on the degree of fatness. The fish are then drained and rinsed in

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ABSTRACTER: Kathryn L. Osterhaug

3.33 FISH HANDLING AND PROCESSING IN U.S.A.: CANNING MACKEREL

Empey, W. A.
Fisheries Newsletter (Australia) 12, No. 11, 13, 15 (November, 1953)

The mackerel canned on the Atlantic Coast is produced from the species Scomber scombrus and on the Pacific Coast from the species Pneumatophorus japonicus diego. About four-fifths of the U. S.-produced canned mackerel is from the Pacific Coast. The East Coast fish are caught in purse seines, iced down in the holds of the vessels and usually have been out of the water from 24 to 36 hours before they are unloaded at the canneries. On the West Coast the fish are not usually iced as the fishing grounds are only from one to five hours distant.

At the Atlantic Coast canneries the fish are cut by automatically-operated knives into can length (4 1/4 inches), and the pieces, after the bellies have been split, are hand-dressed to remove the offal and the dark streak along the backbone. After they have been washed and drained, the pieces are filled into cans and salt is added.

On the Pacific Coast the fish are unloaded at the canneries in the same manner as California sardines. At Monterey they are pumped into the canneries.

The fish are usually prepared and dressed by hand in the canneries, although in some cases machines are used. Hand operations are considered to result in a cleaner product and a higher yield. In some canneries the fish are brined for an hour in 80° to 90° salinometer brine, while in others the fish are packed directly into the cans and salt added to each can in the form of a three-percent salt brine.

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ABSTRACTER: Kathryn L. Osterhaug

FREEZER-SHIPS

CANNING MAINE SARDINES

AGITATION RETORTING

CANNING MACKEREL

3.33 (Cross Reference: 1.2)

fresh water. A final salt content of from two to three percent is considered satisfactory in the canned product.

The brined fish are spread mechanically on "flakes" (rimless metal trays made with a heavy iron framework and covered with one-quarter-inch mesh wire screens) and precooked in open steam-cooking chambers for from eight to 20 minutes, depending on size. They are cooled for from 30 minutes to two hours in drying rooms (at about 160° F.) equipped with blower fans, and then transferred to a cool air tunnel to complete the cooling and drying process.

The cooled fish are hand-packed into flat sardine cans which are automatically filled with winter-pressed cottonseed oil at about 180° F.

More than 90 percent of the sardines canned in Maine are packed in the one-quarter size can which holds from four to 15 fish in the standard grades. Mustard sauce, tomato sauce and special spiced oil are used instead of the usual plain oil in a small proportion of the annual pack.

3.33 (Cross Reference: 1.1)

Canned mackerel fillets, in 1/2-pound and 1-pound ovals are produced in small quantities. In one specialty pack the fillets are skinned. As a rule the cans are heat-exhausted for about 25 minutes at 210° F. and liquid is drained from the cans as they emerge from the exhaust box. Tomato sauce or spiced vinegar sauce is added in some special packs.

Small quantities of the largest California mackerel are canned tuna-style in 1/2-pound cans but such packs are more costly to handle than tuna because of the extra labor involved in separating the white meat and handling the smaller pieces of cooked flesh.

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ship is steered from the wheel inside the fishing bridge. Thus from the shooting of the trawl net until its final recovery on to the trawl deck, the aft fishing bridge can maintain complete control and vision of the entire fishing operation.

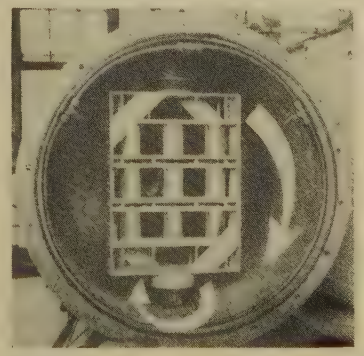
In a factory ship it is of particular importance that the trawl winch should function with complete freedom from breakdown, otherwise all the factory deck machinery would come automatically to a standstill. For this purpose, the trawl winch, in its strategic position slightly abaft amidships at the fore end of the trawl deck and fully protected, offers less likelihood of breakdown, but in assessing the size of the electric or hydraulically driven motor it is safer to overpower considerably.

There follows a description of the factory deck pounds, fish washing machines, and the automatic processing of the fish, and some suggestions on the quick freezing and refrigeration holds.

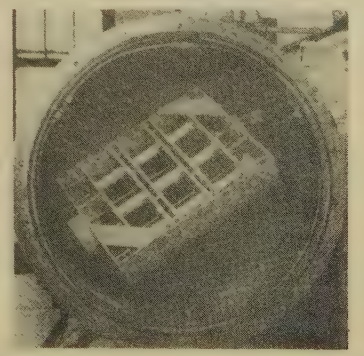
3.33

2. 3.1-minute cook using a 34-r.p.m. end-over-end process.
3. 35-minute still-cook.

By replacing the frame of the yoke in the retort with a basket of the same diameter, approximately 60 No. 2 cans could be processed. The capacity may be increased by increasing the size of the apparatus. The "Multi-Action" unit can probably be made from existing equipment at fairly reasonable cost in most canneries.



ROTATION of frame (arrows) is clockwise, in two directions, at varied speeds. Here frame is in loading position.



SPINNING ACTION added to end-over-end increases the headspace movement. No. 10 cans are in frame.

2.115 CONSTRUCTION AND USE OF JACKETED, COMPLETELY REFRIGERATED FRESH FISH HOLDS

MacCallum, W. A.
World Fishing 3, No. 2, 81 (February, 1954)

The following is the author's summary of a paper presented at the FAO-sponsored World Fishing Boat Congress, Paris, France and Miami, Florida, October, 1953.

This paper gives an account of the design, construction and operational features of the aluminium alloy-lined, argon-arc welded jacketed fresh fish holds of the two 115-ft. wood constructed trawlers, the Cape Fourchu and the Cape Scotari, which have been in service since the spring and summer of 1951 respectively, and which are regularly engaged in 7 and 8 day fishing trips. These fish holds are, to the author's knowledge, the first completely jacketed aluminium alloy-lined and welded fresh fish rooms to be installed aboard ship.

A description is given of jacketed installations, the operating characteristics of fish hold installations, and future pen construction is considered. It is concluded that ice is the logical choice on Canada's east coast to take care of the product heat load which must be contended with when large quantities of fresh fish are stowed within a fish hold in a short space of time. However, the leakage heat load cannot be handled practically in Canada with the use of ice alone, nor with the present employment of conventional grid refrigerated boats in conjunction with the use of ice.

It has been demonstrated that an insulated and cold wall jacketed fish hold possessing a water-tight lining can best provide the refrigeration necessary to control and prevent the flow of leakage heat to the iced fish. With fish holds so constructed, the quality of fish landed is governed only by the

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 Author's summary

4.80 THE ROLE OF CHEMICAL DERIVATIVES IN SEEKING NEW MARKETS FOR FATS

Ault, Waldo C. (Eastern Regional Laboratory, Philadelphia, Pennsylvania)
Journal of the American Oil Chemists' Society 31, No. 3, 31 (March, 1954)

In recent years the production of animal fats has far exceeded domestic demand. This fact has resulted in large scale exports of fats. However, the unstable nature and low prices existing in the export market creates a need for new domestic outlets for these products.

One field that may be capable of utilizing a large amount of excess fats is animal feeds. On the basis of present annual consumption of poultry feeds, the addition of 1% fat to such feeds would utilize nearly all of the present fat surplus.

Animal fats or their component fatty acids may also have potential use as raw materials for organic chemical preparations. The long, straight-chain fatty acids offer definite possibilities for preparing a variety of chemical products. Such products include plastics and resins, rubber, plasticizers, surface-active agents, lubricants and lubricant additives, synthetic fibers and waxes.

The basic chemical and physical information necessary for the practical development of new chemical products from fats is rapidly becoming available by means of research programs now underway.

 ABSTRACTER: W. N Sumerwell

6.133 THE APPLICATION OF IMPULSE RENDERING TO THE ANIMAL-FAT INDUSTRY

Chayen, I. H. and Ashworth, D. R.
Journal of Applied Chemistry 3, No. 12, 529-537 (December, 1953)

Oils and fats from cellular material of animal, vegetable, and marine origin are generally extracted by one of three processes or by a combination of them. They are (1) pressing, (2) solvent extraction, and (3) heat rendering.

In these processes, destruction of the fat cell has to take place before the fat in it can be recovered. The rupturing of the membranes holding the fat is really what constitutes the rendering operation, rather than the particular application of heat for the purpose. All the previously known methods of fat recovery have used one of two principles: (1) the destruction of the cell wall by heat, or (2) its mechanical rupture. Under these conditions the degradation of the fat is difficult to avoid.

The authors have developed on a commercial scale a process known as impulse rendering, which uses a new principle in extraction. The process depends on a mechanical rupture of the membranes of the fat-containing cells by a series of high-speed impulses transmitted through the medium of a liquid, whereby the fat in the cells is liberated and is removed by the liquid in violent movement. In the simplest form of the process, a hammer mill may be used to provide the impulses. The material to be rendered is fed into the mill with the rendering liquid and is removed continuously. The amount of rendering liquid used can be varied widely, but the material to be rendered must always be surrounded by liquid in order that the impulses can be transmitted to the material.

The authors emphasize that impulse rendering is not just a process of attrition in which the whole mass is ground below the cell size of the fat. Many attempts have been made in the past to

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 ABSTRACTER: F. Bruce Sanford

6.3 BIOLOGICAL VALUE OF ALGAL PROTEINS

Bender, A. E.; Miller, D. S.; Tunnah, Elizabeth J.; and Black, W. A. P.
Chemistry and Industry, No. 50, 1340-41 (December 12, 1953)

The red alga Rhodymenia palmata, and the brown algae Laminaria cloustoni, Ascophyllum nodosum, and Pelvetia canaliculata were examined for the nutritive value of their proteins. The samples were all dried at 40-60° C. for 6 to 8 hours and milled to pass a 64-mesh screen.

Dried R. palmata, containing 23.5 percent crude protein, was incorporated into a vitamin-carbohydrate-fat mixture to provide a diet containing 10 percent protein (i.e. 42.5 percent seaweed). Net protein utilization (NPU) in rats was determined by the carcass nitrogen method of Bender and Miller. The values obtained were 40 and 44, with a mean of 42. This compares with peas at 44 and corn at 49. R. palmata might thus be a useful source of protein if mechanical difficulties of its separate collection could be overcome. However, no digestibility trials have, as yet, been carried out.

The brown algae were found to be low in crude protein, L. cloustoni containing 6.4 percent, A. nodosum 8.8 percent, and P. canaliculata 12.7 percent. For this reason, they could not be diluted with the non-protein ingredients of the basal diet, and instead were supplemented with 10 percent margarine fat to increase the calorific value, and 5 percent of a vitamin mixture in a starch medium. The rats refused to eat these diets. Extraction with acetone, ethanol and dilute hydrochloric acid failed to make the algae more palatable.

Recent examination of the algae by paper chromatography has shown all the essential amino acids to be present. Histidine, however, was present only in traces in the dried material.

 ABSTRACTER: Roy C. Stevens

FISH-HOLD CONSTRUCTION

IMPULSE RENDERING

NEW USES FOR ANIMAL FATS

NUTRITIVE VALUE OF ALGAL PROTEINS

6.133 (Cross Reference: 6.23)

render by this means, and they have usually failed because of the difficulty of subsequent separation. Some size reduction occurs in impulse rendering, but the size and degree of reduction can be controlled to an extent depending on the toughness of the material.

Impulse rendering has been worked out for the production of quality oils from high-oil content livers such as cod and grayfish. The authors state that these livers contain 50 to 70 percent oil and only 4 to 7 percent solids.

Fish livers and water are fed to an impulse renderer and go from there to a special basket centrifuge. The centrifuge discharges nearly clear oil and effluent, the relatively small amount of solids being retained in the basket. The effluent is passed to a jet-type bowl centrifuge in the cold. The oil obtained is then heated to 65° and polished in another bowl centrifuge. By this process, 98 percent of the oil is obtained together with one third to one half of the solids in the liver, which are recovered in the form of a slimy cake containing about 25 percent oil. With hot-water treatment, the protein in the cake shrivels, and its oil content is reduced to 12 percent.

Livers such as those of halibut and tuna containing 12 to 20 percent oil and 12 to 30 percent solids can be rendered by this process. Several problems have to be worked out, however, so the process is not yet available for commercial use. Preliminary results show that fish-liver oil made in this way has a vitamin content of up to 20 percent higher than that obtained by conventional processes.

Although a satisfactory large-scale process has not yet been worked out for fish, the authors believe that this will ultimately be accomplished. Two advantages that the process appears to have over conventional ones are the following: (1) It produces meal of low oil content (4%). This is apparently explained by the fish protein becoming swollen with water in impulse rendering, thereby reducing its tendency to retain oil. (2) A light-colored oil of low free fatty acid is obtained.

If the rendering is done cold, too much protein goes into suspension in the water. This solid material coagulates on being heated but is not easy to handle. The authors have found that the tendency of the solids to disperse can be reduced, without affecting the color of the oil, by carrying out the impulse rendering at about 70°. Further work is now being done on this.

Owing to the relatively large amount of water-soluble solids in fish, the authors point to the necessity of evaporating the stickwater from this process--an amount equal to about 70 percent of the water originally in the fish.

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handling and icing of the fish where handling refers not only to the actual physical operation, but to the period during which the fish are under ice.

1.85 USE OF ULTRAVIOLET ("BLACK") LIGHT FOR DETERMINING QUALITY IN ICED SHRIMP

Lane, Charles E. and Whittaker, B. Edward
Special Service Bulletin No. 7, Marine Laboratory, University of Miami, Coral Gables, (December, 1953)

(Abstract of this article appears under 7.89 page 7)

1.85 SHRIMP CANNERS SET NEW STANDARDS

Anonymous
Southern Fisherman 14, No. 2, 31, 39 (February, 1954)

(Abstract of this article appears under 9.3 page 3)

1.87 NEW PROCESS "SPLITS" ROCK LOBSTER TAILS

Anonymous
Quick Frozen Foods 16, No. 7, 218 (February, 1954)

Rock lobster tails weighing more than one pound and heretofore considered too large for marketing are now being split, glazed and packed 22 to 36 to the 20-pound box. The reduced sizes make for easier handling, cooking and eating.

2.00 SORBIC ACID AS A MOLD INHIBITOR

Smith, Donald P. and Rollin, J. Norbert
Modern Packaging 27, No. 4, 139-41, 184 (December, 1953)

2.00 BRITISH DEVELOP NOVEL METHOD OF DETERMINING FRESHNESS OF FISH

Anonymous
United States Department of the Interior, Fish and Wildlife Service, Seattle, Washington, Fishery Products Report No. S-42 (March 3, 1954)

(Abstract of this article appears under 7.80 page 1)

2.01 USE OF ULTRAVIOLET ("BLACK") LIGHT FOR DETERMINING QUALITY IN ICED SHRIMP

Lane, Charles E. and Whittaker, B. Edward
Special Service Bulletin No. 7, Marine Laboratory, University of Miami, Coral Gables, (December, 1953)

(Abstract of this article appears under 7.89 page 7)

2.02 SWELLING OF AQUATIC ANIMAL MUSCLES. I. INFLUENCE OF pH

Okada, Minoru and Tada, Setsuko
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 3, 178 (1953) (English summary and figures)

"Swelling of fish muscle cannot be explained simply on basis of osmotic pressure alone. It seems to have a close relation with hydration of muscle proteins, especially that of myosin."

2.02 "ADENOSINE TRIPHOSPHATE-CREATINE TRANSPHOSPHORYLASE" AS RELAXING FACTOR OF MUSCLE

Lorand, L.
Nature 172, No. 4391, 1181-83 (December 26, 1953)

2.08 SCIENTIFIC DESIGN ASSURES SANITARY FISH HOLDS

Anonymous
Fishing Gazette 70, No. 9, 58, 62 (September, 1952)

(Abstract of this article appears under 2.115 page 15 - December, 1953 issue)

2.1120 NEW METAL ALLOY SEINE FLOAT

Anonymous
World Fishing 3, No. 1, 46 (January, 1954)

A new seine float, made entirely of pressings of aluminum magnesium alloy welded together, has recently been produced by a Grimsby, England company. The float is a 5-inch sphere with a bow handle. It is very light in weight, and its extra buoyancy should reduce the number of floats needed on the head-line, but at the same time it is claimed that it is strong enough to allow fishing at considerable depths without crushing, and to resist ordinary accidental damage. The alloys of which it is made are immune from corrosion, which should give the float a long working life, and obviate rotting of the net when stowed.

2.1127 FISHING VESSEL LIVE-BAIT EQUIPMENT

Carlson, Carl B.
Commercial Fisheries Review 16, No. 1, 1-7 (January, 1954)

(Abstract of this article appears under 2.115 page 5)

2.1127 ADVANTAGES IN DRUGGING FISH

Anonymous
Pan American Fisherman 8, No. 8, 4 (March, 1954)

(Abstract of this article appears under 9.19 page 1)

2.3 THE COST OF OPERATING A FILLETING AND FREEZING PLANT

Anonymous
Canadian Fisherman 41, No. 2, 13 (February, 1954)

2.3 MECHANIZATION SPURS FROZEN FISH PROGRESS

Anonymous
Quick Frozen Foods 16, No. 7, 207-216 (February, 1954)

The article discusses newly developed frozen fish products and the mechanized equipment developed to process them.

2.3 WEIGHT LOSS ON DRESSING AND METHODS OF PROCESSING GAME FISH

Ford, John R. and Ball, Robert C.
Quarterly Bulletin of the Michigan Agricultural Experiment Station 34, No. 1, 65-74 (August, 1951)

(Abstract of this article appears under 9.16 page 17 - January, 1954 issue)

4.21 A NEW ACCELERATED HOLDING TEST INVOLVING AERATION OF OILS IN IRON TUBES

Luckmann, F ederick H.; Melnick, Daniel; and Miller, James D.
Journal of the American Oil Chemists' Society 30, No. 12, 602 (December, 1953)

4.82 USE OF ANIMAL FATS IN FEEDS

Kraybill, H. R.
Flour and Feed 54, No. 6, 20 (November, 1953)

The major reasons to add stabilized animal fats to feeds are the following: (1) increased palatability; (2) control of dustiness; (3) increased feed efficiency; and (4) favorable price of fats vs. other energy feeds.

4.90 ANNUAL REVIEW OF LITERATURE ON FATS, OILS, AND SOAPS. II.

Piskur, M. M.
Journal of the American Oil Chemists' Society 30, No. 6, 228-246 (June, 1953)

(Abstract of this article appears under 8.53 page 19 - November, 1953 issue)

6.15 THE VALUE OF FISH SOLUBLES AND A VITAMIN B_{12} - ANTIBIOTIC SUPPLEMENT IN CHICKEN AND TURKEY MASH MIXTURES CONTAINING TEN PERCENT MEAT SCRAPS

Halbrook, E. R.; Beeckler, A. F.; and Smith, Ervin P.
Poultry Science 32, No. 6, 1058-1068 (November, 1953)

(Abstract of this article appears under 6.193 page 3 - April, 1954 issue)

6.193 UNIDENTIFIED FACTORS IN POULTRY NUTRITION. I. DEVELOPMENT OF CHICK ASSAY

Lillie, Robert J.; Sizemore, J. R.; and Bird, H. R.
Poultry Science 32, No. 5, 855-862 (September, 1952)

(Abstract of this article appears under 7.69 page 3 - April, 1954 issue)

6.199 FEEDING OF RATS WITH SODIUM NITRITE AND HERRING-MEAL PRODUCED FROM HERRING PRESERVED WITH SODIUM NITRITE

Njaa, Leif Rein and Braekkan, Olaf R.
Report on Technological Research Concerning Norwegian Fish Industry II, No. 14, (1953) 14 pp. (English summary)

(Abstract of this article appears under 0.7 page 9 - March, 1954 issue)

6.3 STUDIES ON COLLOIDAL EQUILIBRIUM IN DILUTED ALGIN SOLUTION. I. VISCOSITY BEHAVIOR OF SODIUM ALGINATE SOLUTION

Kato, Kenji
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 1, 76-81 (May, 1953)

6.3 THE UNSATURATED FATTY ACIDS OF THE ALGA CHLORELLA

Paschke, R. F. and Wheeler, D. N.
Journal of the American Oil Chemists' Society 31, No. 3, 81-85 (March, 1954)

6.3 STUDIES ON MECHANISMS OF MANUFACTURING ALGIN

Suzuki, Noboru
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 1, 60-75 (May, 1953)

PART II. ON DISSOLUTION OF FREE ALGINIC ACID

"Alginic acid is dissolved into alkali alginate by every alkali salt of weak acid whose dissociation constant is less than that of alginic acid, that is, less than 0.87×10^{-1}."

PART III. ON DISSOLUTION OF CALCIUM ALGINATE BY DOUBLE DECOMPOSITION

"The solubility product of Ca-alginate should be considered as of the order of 10^{-6} "

PART IV. ON DISSOLUTION OF CALCIUM ALGINATE BY ION EXCHANGE REACTION

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Atlantic Fisherman
Australian Journal of Marine and Freshwater Research
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Commercial Fisherman
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishermen's News
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Science Abstracts
Food Technology
Foreign Commerce Weekly
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Meldinger Fra SSF (Herring Industry, Norway)
Modern Packaging
Modern Refrigeration
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

6.3 CHEMICAL STUDIES ON MARINE ALGAE. VIII. THREONINE AND SERINE CONTENTS IN VARIOUS SPECIES OF MARINE ALGAE

Takagi, Mitsuzo
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 1, 92-95 (May, 1953)

"The proportion of threonine content to crude protein was estimated as from 0.86 to 2.69% in green algae, 1.51 to 4.72% in brown algae, and 1.05 to 5.64% in red algae. The proportion of serine content to crude protein was estimated as from 4.98 to 14.30% in green algae, 4.22 to 20.36% in brown algae, and 6.94 to 19.56% in red algae."

6.3 CHEMICAL STUDIES ON MARINE ALGAE. 6. CHANGE OF NITROGEN DISTRIBUTION OF DRIED LAVER, PORPHYRA TENERA, DURING PRESERVATION

Takagi, Mitsuzo
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 4, 250 (March, 1953)
(English summary, tables, and figure)

"Dried laver, Porphyra tenera, was preserved in transparent or brown desiccators in which the relative humidities were maintained at 90% and 77.6%. At 90%, relative humidity, total nitrogen and diamino nitrogen decreased, but amide nitrogen increased."

7.53 STUDIES ON THE ODOUR OF CUTTLE-FISH LIVER OIL. III. IDENTIFICATION OF CARBONYL COMPOUNDS BY AERATION

Obata, Yataro and Matano, Kagenori
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 10, 506 (1953)
(English summary, figure and table)

"The volatile carbonyl compounds have been isolated as 2,4-Dinitrophenylhydrazones from cuttle-fish oil by aeration method at room temperature."

7.53 REPORT ON FISH AND FISH PRODUCTS

Voth, Menno D.
Journal of the Association of Official Agricultural Chemists 36, No. 3, 606 (August, 1953)

(Abstract of this article appears under 7.43 page 1 - January, 1954 issue)

7.53 DETECTION OF POLYMERISED FISH OIL

Hugel, E.
Fette und Seifen 8, 544 (1953)

The presence of polymerised oil is revealed through the presence of insoluble glycerides in propyl alcohol at a temperature between 5° and 20°C.

7.80 CORRECTED NORMAL AND CHI-SQUARE APPROXIMATIONS TO THE BINOMIAL DISTRIBUTION IN ORGANOLEPTIC TESTS

Roessler, E. B.; Baker, G. A.; and Amerine, M. A.
Food Research 18, No. 6, 625 (November/December, 1953)

7.80 A UNIVERSAL GUSTOMETRIC SCALE IN D-UNITS

Dove, W. Franklin
Food Research 18, No. 5, 427-53 (September/October, 1953)

7.80 FLAVOUR ASSESSMENT--A BIOMETRICIAN'S VIEWPOINT

Irwin, J. O.
Chemistry and Industry, No. 51, 1348 (December 19, 1953)

7.81 STUDIES ON SHARK MUSCLE. PART 3. PUTREFACTION AND INDOL CONTENT OF SHARK MEAT

Ohoishi, Keiichi
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 1, 43-45 (May, 1953)

"So far as indol content is concerned, the shark meat which is preserved at temperatures below 20°C. hardly shows putrefactive features, though it does have plentiful ammonia content."

7.81 INVESTIGATION ON KEEPING QUALITY OF MILD CURED HERRING

Gilberg, Yngvar
Report on Technological Research Concerning Norwegian Fish Industry II, No. 12 (1953) 23 pp.
(English summary)

(Abstract of this article appears under 3.5 page 3 - March, 1954 issue)

7.81 INVESTIGATION ON KEEPING QUALITY OF MILD CURED HERRING TREATED WITH VINEGAR

Gilberg, Yngvar
Report on Technological Research Concerning Norwegian Fish Industry II, No. 11 (1953) 23 pp.
(English summary)

(Abstract of this article appears under 3.5 page 3 - March, 1954 issue)

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8.50 NUTRITIVE VALUE OF CANNED FOODS

Tepley, L. J.; Derse, P. H.; Krieger, C. H.; and Elvehjem, C. A.
Journal of Agricultural and Food Chemistry 1, No. 20, 1204-07 (December, 1953)

(Abstract of this article appears under 8.64 page 7 - April, 1954 issue)

8.51 THE AMINO ACID COMPOSITION OF A PROTEIN ISOLATED FROM LOBSTER NERVE

Koechlin, Bernard A. and Parish, Harriet D.
Journal of Biological Chemistry 205, No. 2, 597-604 (December, 1953)

The quantitative amino acid composition of a highly purified protein prepared from lobster nerve has been determined chromatographically.

8.51 BIOCHEMICAL STUDIES ON "SURUME-IKA (OMMASTREPHES SLOANI PACIFICUS). III. ON BASIC SUBSTANCES IN MUSCLE OF SQUID

Yoshimura, Katsuji and Shibata, Takeshi
Bulletin of the Faculty of Fisheries, Hokkaido University 4, No. 1, 54-59 (May, 1953)

"Substances found by paper chromatography are histidine, arginine, lysine, proline, and choline. Lysine also is found by lysine picrate."

8.51 ON THE NITROGENOUS CONSTITUENTS OF FUCUS VESICULOSUS

Smith, Donald G. and Young, E. Gordon
Journal of Biological Chemistry 205, No. 2, 849-58 (December, 1953)

Quantitative chromatography indicated the presence of protein similar in constitution to leaf protein.

8.51 THE NITROGENOUS EXTRACTIVES FROM FRESH FISH MUSCLE. II. COMPARISON OF SEVERAL GADOID AND ELASMOBRANCH SPECIES

Shewan, J. M.
Journal of the Science of Food and Agriculture 4, No. 12, 565-68 (December, 1953)

(Abstract of this article appears under 8.59 page 3 - April, 1954 issue)

8.59 THE MAILLARD REACTION IN FLESH FOODS

Tarr, H. L. A.
Food Technology 8, No. 1, 16-19 (January, 1954)

(Abstract of this article appears under 7.599 page 7 - March, 1954 issue)

8.64 VITAMIN CONTENT OF FISHERY BYPRODUCTS. PART 1. EFFECT OF PROCESSING METHODS ON RIBOFLAVIN, NICOTINIC ACID, AND VITAMIN B_{12} CONTENT OF SOLUBLES AND MEAL

Karrick, N. L. and Stansby, M. E.
Commercial Fisheries Review 16, No. 2, 7-10 (February, 1954)

(Abstract of this article appears under 6.139 page 11)

8.65 ON THE SO-CALLED VITAMIN C OF CANNED BONITO IN BRINE

Fujimaki, Masao; Odagiri, Satoshi; and Inagaki, Choten
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 12, 703 (1953)
(English summary, tables and figures)

8.7 STUDIES ON THE CUTTLE-FISH OIL

Takei, Toshiro
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 10, 569 (1953)
(English tables and figures only)

9.3 FEDERAL ACTION ON LOW-SODIUM FOODS

Anonymous
Journal of the American Dietetic Association 29, No. 12, 1203 (December, 1953)

The aim of these actions is to improve the labeling of special dietary foods and of certain frozen vegetables commonly used in low-salt diets, so that patients and physicians will be better able to calculate the sodium intake from such foods.

9.6 ANNUAL REPORT OF THE FISHERIES RESEARCH BOARD OF CANADA, 1952

Reed, G. B. and Dymond, J. R.
Annual Report of the Fisheries Research Board of Canada for the Year 1952, 231 pp.

(Abstract of this article appears under 1.0111 page 19 - February, 1954 issue)

9.7 VISITORS' TABLES AT COLONIAL FISHERIES RESEARCH STATIONS

Hickling, C. F.
Nature 172, No. 4385, 885 (November 14, 1953)

The Colonial Office is establishing a number of fisheries research stations at suitable points in the British Colonial Empire for the application and adaptation of existing knowledge, methods and techniques of fishery and of marine and freshwater biological research to Colonial problems.

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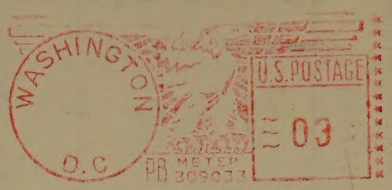

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